



**VSI-X HT PACKER**  
w/ VITON, CARBIDE, STUB ACME  
MANDREL, INCOLOY 925 FLOW WET  
6-5/8" X 3-1/2" (9.3#) CS HYDRIL

Manual No:  
**DL-601-6625-1279**

Revision: **A**

Revision Date:  
**10/14/2019**

Authored by: J.Anderson

Approved by: K.Plunkett

**A) DESCRIPTION**

The VSI-X Single String Double-Grip Production Packer is one of the most versatile packers on the market. This packer is a modification of the ASI-X Packer with the advantage of being able to set on electric line or hydraulically.

An On-Off Tool Stinger with a Wireline Plug installed can be attached to the top of this packer. This packer can then be lubricated in the hole and set under pressure. Once set, casing pressure can be bled off, and the tubing with an On-Off Tool Overshot can be run and latched onto the packer. The Wireline Plug can then be removed.

This packer easily converts to a mechanically set ASI-X Packer – just remove the shear screws and install drag blocks and drag block springs. The ASI-X Packer sets with 1/4 right-hand rotation and releases with 1/4 right-hand rotation. The ASI-X Packer can be left in tension, compression or neutral.

**NOTE1:** Stinger and Wireline Adapter Kit (WLAK) must be purchased separately.

**NOTE2:** This packer requires at least a 30 second burn on the wireline setting tool to ensure a proper set. A burn time less than 30 seconds may shear the setting tool from the packer before fully setting the packer.

**B) RELATED TOOLS (sold separately)**

B-1) 6-5/8" X 3-1/2" Wireline Adapter Kit (WLAK).

B-2) 6-5/8" X 3-1/2" On/Off Tool.

B-3) 3-1/2" Stinger—actual P/N varies depending on customer requirements.

**C) SPECIFICATION GUIDE**

CASING			TOOL		THREAD CONNECTION BOX UP / PIN DOWN	PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)	OD (INCHES)	NOMINAL ID (INCHES)		
6-5/8	20.0 – 24.0	5.921 – 6.049	5.750	3.00	3-1/2 (9.3#) CS HYDRIL	60168HTVC8LGJHA

**NOTE3:** Tool listed is right-hand set / right-hand release.

**NOTE4:** Use of a Double Hook J-slot Packer is recommended when running with a pumpjack to help prevent the packer from unsetting during well production.

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
10,000 PSI	154,000 LBS

D & L OIL TOOLS  
P.O. BOX 52220 TULSA, OK 74152  
PHONE: (800) 441-3504 [www.dloiltools.com](http://www.dloiltools.com)



# VSI-X HT PACKER

w/ VITON, CARBIDE, STUB ACME  
MANDREL, INCOLOY 925 FLOW WET  
6-5/8" X 3-1/2" (9.3#) CS HYDRIL

Manual No:  
**DL-601-6625-1279**

Revision: **A**

Revision Date:  
**10/14/2019**

Authored by: J.Anderson

Approved by: K.Plunkett

## D) PRE-INSTALLATION INSPECTION PROCEDURES

**CAUTION1:** D&L ships tool connections made-up **HAND TIGHT**—labeled with hand-tight tape on the tool (Fig. 1) — unless stated otherwise. Tighten/torque all connections properly before operating tool.



Fig. 1

GENERAL THREAD CONNECTION TORQUE RECOMMENDATIONS			
STUB ACME / ACME THREADS	INTERNAL TAPERED TUBING THREADS		PREMIUM THREADS
	UP TO 2-3/8"	GREATER THAN 2-3/8"	
600 – 800 FT-LBS	600 – 800 FT-LBS	800 – 1,200 FT-LBS	Consult thread manufacturer's recommendations.

GENERAL SCREW TORQUE RECOMMENDATIONS									
SCREW SIZE (INCHES)	#6	#8	#10	1/4	5/16	3/8	7/16	1/2	5/8 and larger
TORQUE RANGE (INCH-POUNDS)	5 – 8	10 – 15	18 – 25	25 – 40	50 – 80	90 – 135	160 – 210	250 – 330	450 - 650

Before first use, D&L recommends disassembly and inspection of the tools unless stated otherwise. Ensure parts have not been damaged during shipping. Replace damaged parts with D&L replacement parts. Contact D&L sales for replacement part information.

Re-assemble the tool after inspection. Install parts in the correct order and orientation. Properly tighten connections.

Before re-using the tool, D&L recommends disassembly and inspection of the tool. Clean parts and ensure parts are in good working condition. Replace worn or damaged parts with D&L replacement parts.

When redressing the tool, D&L recommends replacement of all seals, elements, o-rings, shear screws, etc. Contact D&L sales for redress kit and/or other part information.

## E) RELEASING PROCEDURES

The releasing procedures are the same whether the packer has been tension or compression set. Set down weight on the packer to unseat the J-pin from the tension shoulder of the J-slot. Refer to the Pressure Affected Area Guide to determine necessary set down weight on the packer. Rotate the work string 1/4 right-hand turn at the packer and pick up while holding right hand torque. Weight in addition to pipe weight may be required to pick up on packer – refer to Pressure Affected Area Guide. The internal by-pass will open, allowing pressure to equalize. After pressure is equalized, continue to pick up to release the upper slips, relax the elements and release the lower slips thus allowing the packer to be re-set or removed from the well.

**CAUTION2:** High differential pressure below the VSI-X HT Packer may cause the upper slips to wedge in tighter, requiring an extra amount of tension to release the upper slips.

## F) STORAGE RECOMMENDATIONS

When preparing the tool for storage, follow the Pre-Installation Inspection Procedures. Re-assemble the tool with connections hand-tight only and in running position if applicable. Elements should be in a relaxed state—free from tension, compression and other stresses that could cause deformation.

Store the tool, if possible, in an enclosed, temperature and humidity controlled environment. Avoid excessively high temperatures over long periods of time. Shield elastomeric parts from ultraviolet light sources. Keep tool dry and protected from condensation. Do not store in contact with or near volatile or corrosive chemicals. Do not store near ozone generating equipment or operations such as welding.



# VSI-X HT PACKER

w/ VITON, CARBIDE, STUB ACME  
MANDREL, INCOLOY 925 FLOW WET  
6-5/8" X 3-1/2" (9.3#) CS HYDRIL

Manual No:  
**DL-601-6625-1279**

Revision: **A**

Revision Date:  
**10/14/2019**

Authored by: J.Anderson

Approved by: K.Plunkett

## G) PRESSURE AFFECTED AREA GUIDE

When set downhole, the packer mandrel is subjected to a force created by differential pressure above or below the packer that acts on the pressure affected area (i.e., the piston effect). Depending on the tubing size and weight and the seal area of the packer the force created by differential pressure acts upwards or downwards on the packer mandrel. An upward force, designated as a negative (-) value, acts to push the packer mandrel up hole and must be accounted for when releasing the packer. A downward force, designated as a positive value, acts to push the packer mandrel down hole and must be accounted for when releasing the packer. Other factors (e.g., tubing movement due to temperature change) must be considered separately to determine all the forces acting on the packer.

PACKER SIZE (INCHES)	TUBING SIZE (INCHES)	PRESSURE AFFECTED AREA (SQ. INCHES)	
		ABOVE	BELOW
6-5/8	2.375	6.43 (DOWN)	-7.74 (UP)
	2.875	4.37 (DOWN)	-6.19 (UP)
	3.500	1.24 (DOWN)	-3.83 (UP)

**Example:** Consider a 6-5/8" X 3-1/2" VSI-X HT Packer set on 3.500" tubing with a differential pressure of 3,000 psi in the annulus around the tubing above the packer. What is the force acting on the seal area of the mandrel?

To calculate the force (lbs) acting on the seal area of the mandrel, refer to the Pressure Affected Area Guide for a 6-5/8" X 3-1/2" VSI-X HT Packer set on 3.500" tubing. In this example, the differential pressure from above the packer acts on the seal area of the packer mandrel across a pressure affected area of 1.24 in<sup>2</sup>. Multiplying the differential pressure (3,000 psi) by the pressure affected area (1.24 in<sup>2</sup>) results in a force of 3,720 lbs. The piston effect on the packer mandrel is an upward force of 3,720 lbs.

## H) ELASTOMER TRIM TEMPERATURE GUIDE

NITRILE (STD)			
TEMPERATURE RANGE (F°)	DUROMETER		
	END	MIDDLE	END
40° - 125°	80	70	80
125° - 250°	90	70	90
150° - 250°	90	80	90
300° +	Contact D&L Sales		

RUBBER TYPE	TEMPERATURE RANGE
NITRILE	40° - 250°F
HSN (HNBR)	70° - 300°F
VITON	100° - 350°F

## I) RECOMMENDED TOOLS

- VISE
- GLOVES
- ALLEN WRENCHES
- TAPE MEASURE
- O-RING PICK
- BAR
  - 1/2-INCH
  - 3/4-INCH
- PAINT BRUSH, 2-INCH
- PIPE WRENCH, 3-FT (2 EA)
- "CHEATER" PIPE, 4-FT LONG
- ADJUSTABLE WRENCH, 12-INCH
- CORDLESS DRILL, 18V
- SNAP RING SPREADER PLIERS
- ALIGNING PUNCH
- SCREWDRIVER SET, FLAT-TIPPED
- SOCKET SETS
  - 3/8-INCH DRIVE
  - 1/2-INCH DRIVE
- HAMMERS
  - SLEDGE
  - BALL PEEN
  - DEAD BLOW



**VSI-X HT PACKER**  
w/ VITON, CARBIDE, STUB ACME  
MANDREL, INCOLOY 925 FLOW WET  
6-5/8" X 3-1/2" (9.3#) CS HYDRIL

Manual No:  
**DL-601-6625-1279**

Revision: **A**

Revision Date:  
**10/14/2019**

Authored by: J.Anderson

Approved by: K.Plunkett

## J) DISASSEMBLY

J-1) Clamp spring cage (5) in vise.

J-1.1) Unscrew and remove shear screws (3) from J-body (20).

J-1.2) Unscrew and remove bottom nipple (32) from J-pin bottom sub (23).

J-1.3) Unscrew and remove set screws (28) from J-pin bottom sub (23). Move J-body (20) as needed.

J-1.4) Unscrew and remove J-pin bottom sub (23) from inner mandrel (2).

**NOTE<sub>5</sub>**: Drag block body assembly must be free to rotate.

J-1.4.1) Remove o-ring (34) from J-pin bottom sub (23).

J-1.5) Unscrew and remove set screws (22) from J-body (20).

J-1.6) Unscrew and remove J-body (20) from drag block body (18) (**NOTE<sub>6</sub>**: Left-hand threads).

J-1.7) Unscrew and remove rubber mandrel cap (19) from rubber mandrel (11).

**NOTE<sub>7</sub>**: For added leverage, insert a rod through rubber retainer (15) and rubber mandrel (11) as needed.

J-1.8) Remove retaining ring (21) from drag block body (18).

J-1.9) Wedge lower slips (17) outward (if needed). Remove drag block body assembly and disassemble:

J-1.9.1) Remove wedges (if needed) and remove lower slips (17) and lower slip springs (25) from drag block body (18).

J-1.10) Unscrew and remove lower cone (16) from rubber retainer (15).

J-1.11) Unscrew rubber mandrel (11) from center coupling (10).

**NOTE<sub>8</sub>**: For added leverage, insert a rod through upper cone (9) as needed.

J-1.12) Remove rubber mandrel assembly and disassemble:

J-1.12.1) Remove elements (13, 14), rubber spacers (12), and rubber retainer (15) from rubber mandrel (11).

J-1.13) Unscrew and remove center coupling (10) from upper cone (9).

J-1.13.1) Remove bonded seal (24) and o-ring (35) from center coupling (10).

J-1.13.1.1) Remove o-ring (33) from bonded seal (24).

J-1.14) Remove bearing bushing (30) from inner mandrel (2).

J-1.15) Remove upper cone (9) from inner mandrel (2)

J-2) Unclamp spring cage (5) from vise. Clamp lower end of inner mandrel (2) in vise.

**CAUTION<sub>6</sub>**: Do NOT wrench or clamp on seal surface.

J-2.1) From upper end of tool, unscrew and remove shear screws (3) from spring cage (5).

**CAUTION<sub>3</sub>**: Compression spring (4) is compressed with tension against spring cage assembly.

**NOTE<sub>10</sub>**: Press down top sub (1) to compress compression spring (4) as necessary.

J-2.2) Unscrew and remove spring cage cap (27) from spring cage (5).

**CAUTION<sub>3</sub>**: Compression spring (4) is compressed with tension against spring cage assembly.

**NOTE<sub>10</sub>**: Press down top sub (1) to compress compression spring (4) as necessary.

J-2.3) Unscrew and remove set screws (28) from top sub (1).

J-2.4) Unscrew and remove top sub (1) from inner mandrel (2).

J-2.4.1) Remove o-ring (34) from top sub (1).

J-2.5) Remove compression spring (4) from inner mandrel (2).

J-2.6) Wedge slips outwards (if needed). Remove spring cage assembly and disassemble:

J-2.6.1) Remove wedges (if needed) and remove releasing slip (7), upper slips (8) and upper slip springs (26) from spring cage (5).



# VSI-X HT PACKER

w/ VITON, CARBIDE, STUB ACME  
MANDREL, INCOLOY 925 FLOW WET  
6-5/8" X 3-1/2" (9.3#) CS HYDRIL

Manual No:  
**DL-601-6625-1279**

Revision: **A**

Revision Date:  
**10/14/2019**

Authored by: J.Anderson

Approved by: K.Plunkett

## J) DISASSEMBLY (cont'd)

J-2.6.2) Unscrew and remove upper slip body (6) from spring cage (5).

J-2.6.3) Remove spring retainer ring (31) from upper slip body (6).

J-3) Unclamp and remove inner mandrel (2) from vise.

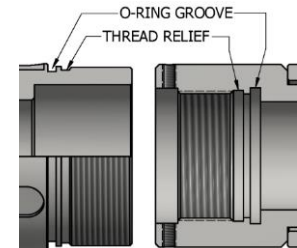


Fig 3

## K) ASSEMBLY

**NOTE<sub>9</sub>:** Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

**CAUTION<sub>4</sub>:** To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs (Fig 3).

K-1) Clamp lower end of inner mandrel (2) in vise.

**CAUTION<sub>6</sub>:** Do NOT wrench or clamp on seal surface.

K-1.1) Assemble spring cage assembly and install:

K-1.1.1) Install upper slips (8), releasing slip (7) and upper slip springs (26) into upper slip body (6). Wedge slips outwards.

**NOTE<sub>11</sub>:** Install two (2 ea) springs per slip (Fig. 5).

K-1.1.2) Install spring retainer ring (31) into upper slip body (6).

K-1.1.3) Screw upper slip body (6) onto spring cage (5).

K-1.1.4) Install spring cage assembly onto inner mandrel (2). Remove wedges.

K-1.2) Install compression spring (4) onto inner mandrel (2).

K-1.3) Install o-ring (34) in o-ring groove in top sub (1).

K-1.4) Screw top sub (1) onto inner mandrel (2).

**CAUTION<sub>5</sub>:** Do not rip or tear o-ring during installation.

**CAUTION<sub>3</sub>:** Compression spring (4) is compressed with tension against spring cage assembly.

K-1.5) Screw set screws (28) into top sub (1).

K-1.6) Screw spring cage cap (27) onto spring cage (5).

**CAUTION<sub>3</sub>:** Compression spring (4) is compressed with tension against spring cage assembly.

**NOTE<sub>10</sub>:** Press down top sub (1) to compress compression spring (4) as necessary.

K-1.7) Align threaded holes in spring cage (5) with recessed holes in top sub (1). Screw shear screws (3) into spring cage (5). Tighten until shear screws (3) contact top sub (1). Back shear screws (3) out 1/4 turn..

**CAUTION<sub>3</sub>:** Compression spring (4) is compressed with tension against spring cage assembly.

**NOTE<sub>10</sub>:** Press down top sub (1) to compress compression spring (4) as necessary.

K-2) Unclamp inner mandrel (2) from vise. Clamp spring cage (5) in vise.

K-2.1) From lower end of tool, install upper cone (9) onto lower end of inner mandrel (2). Slide upper cone (9) until the flange of upper cone contacts shoulder of inner mandrel (2).

K-2.2) Install bearing bushing (30) onto inner mandrel (2) and into upper cone (9).

K-2.3) Install o-ring (33) into o-ring groove in bonded seal (24).

K-2.4) Install bonded seal (24) into center coupling (10).

**CAUTION<sub>5</sub>:** Do not rip or tear o-ring during installation.

K-2.5) Install o-ring (35) into o-ring groove in center coupling (10).

K-2.6) Screw center coupling (10) onto upper cone (9).

**NOTE<sub>8</sub>:** For added leverage, insert a rod through upper cone (9) as needed.

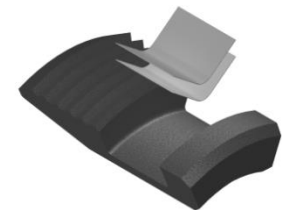


Fig. 5



# VSI-X HT PACKER

w/ VITON, CARBIDE, STUB ACME  
MANDREL, INCOLOY 925 FLOW WET  
6-5/8" X 3-1/2" (9.3#) CS HYDRIL

Manual No:  
**DL-601-6625-1279**

Revision: **A**

Revision Date:  
**10/14/2019**

Authored by: J.Anderson

Approved by: K.Plunkett

## K) ASSEMBLY (cont'd)

K-2.7) Assemble rubber mandrel assembly and install:

K-2.7.1) Install rubber retainer (15), elements (13, 14) and rubber spacers (12) onto rubber mandrel (11).

K-2.7.2) Install rubber mandrel assembly onto inner mandrel (2).

K-2.7.3) Screw rubber mandrel (11) into center coupling (10).

**CAUTIONs:** Do not rip or tear o-ring during installation.

K-2.8) Screw lower cone (16) into rubber retainer (15).

K-2.9) Assemble drag block body assembly and install:

K-2.9.1) Install lower slips (17) and lower slip springs (25) into drag block body (18).

**NOTE<sub>12</sub>:** Install two (2ea) springs per slip (Fig. 6).

K-2.9.2) Install drag block body assembly onto rubber mandrel (11). Remove wedges.

K-2.10) Screw rubber mandrel cap (19) onto rubber mandrel (11).

**NOTE<sub>7</sub>:** For added leverage, insert a rod through rubber retainer (15) and rubber mandrel (11) as needed.

K-2.11) Install drag block retainer (21) onto drag block body (18).

K-2.12) Screw J-body (20) onto drag block body (18) (**NOTE<sub>6</sub>:** Left-hand threads).

K-2.13) Screw set screws (22) into J-body (20).

K-2.14) Install o-ring (34) into o-ring groove in J-pin bottom sub (23).

K-2.15) Screw J-pin bottom sub (23) onto inner mandrel (2).

**CAUTIONs:** Do not rip or tear o-ring during installation.

**NOTE<sub>5</sub>:** Drag block body assembly must be free to rotate.

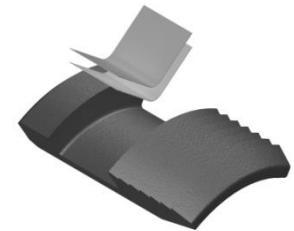


Fig. 6

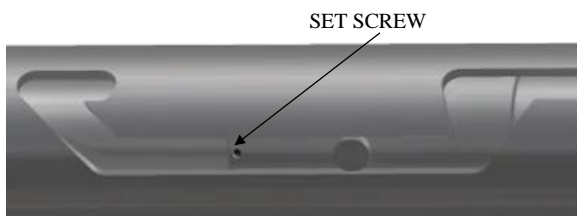


Fig. 7

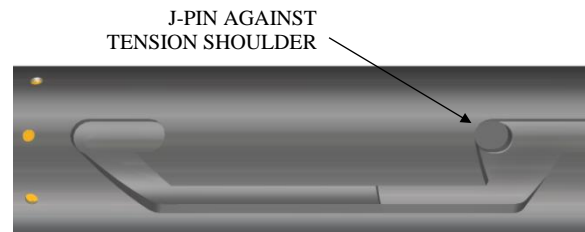


Fig. 8

K-2.16) Rotate J-body (20) as needed to position J-pin of J-pin bottom sub (23) along J-slot to access threaded holes (Fig. 7). Screw set screws (28) into J-pin bottom sub (23).

K-2.17) Position J-pin of J-pin bottom sub (23) on tension shoulder in J-slot of J-body (20) (Fig. 8).

K-2.18) Align threaded holes in J-body (20) with pocket holes in rubber mandrel cap (19). For added leverage wrench on rubber retainer (15) as needed to properly align threaded holes.

K-2.19) Screw shear screws (3) into J-body (20). Tighten until shear screws (3) contact rubber mandrel cap (19). Back shear screws (3) out 1/4 turn.

K-2.20) Screw bottom nipple (32) into J-pin bottom sub (23).

K-3) Unclamp spring cage (5) from vise and remove assembled tool.



**VSI-X HT PACKER**  
w/ VITON, CARBIDE, STUB ACME  
MANDREL, INCOLOY 925 FLOW WET  
6-5/8" X 3-1/2" (9.3#) CS HYDRIL

Manual No:  
**DL-601-6625-1279**

Revision: **A**

Revision Date:  
**10/14/2019**

Authored by: J.Anderson

Approved by: K.Plunkett

**L) PARTS LIST**

ITEM	QTY	DESCRIPTION	MATERIAL	PART NUMBER
1	1	TOP SUB	DLMINC925	60168611HTLGJHA
2	1	INNER MANDREL	DLMINC925	60168211HT-L
3	16	SHEAR SCREW (2375#)	DLM360BRS	60100990
4	1	COMPRESSION SPRING	DLMCRSP	60373920
5	1	SPRING CAGE	DLMS60	60174310
6	1	UPPER SLIP BODY	DLMS110	60068320
7	1	RELEASING SLIP	DLMS110	60073125
8	2	UPPER SLIP W/ CARBIDE	DLMS110	60073115C
9	1	UPPER CONE	DLMS110	60373410HT
10	1	CENTER COUPLING	DLMS80	60273620
11	1	RUBBER MANDREL	DLMS60	60073220
12	2	RUBBER SPACER	DLMS35	60268840
13	1	ELEMENT	80 DURO VITON	60268512V
14	2	ELEMENT	90 DURO VITON	60268513V
15	1	RUBBER RETAINER	DLMS60	60273850
16	1	LOWER CONE	DLMS110	60073420HT
17	4	LOWER SLIP	DLMS110	60068135C
18	1	DRAG BLOCK BODY	DLMS35	60068335
19	1	RUBBER MANDREL CAP	DLMS60	60173230
20	1	J-BODY	DLMS60	60173340HT
21	1	DRAG BLOCK RETAINER	DLMS60	60068910
22	3	SOCKET SET SCREW 3/8-16 UNC X 3/8	STEEL	SSS037C037
23	1	SOLID BOTTOM	DLMINC925	60373634HT-L
24	1	BONDED SEAL	DLMS60 / 90 DURO VITON	60073520V
25	8	LOWER SLIP SPRING	-	7170901
26	6	UPPER SLIP SPRING	-	7170902
27	1	SPRING CAGE CAP	DLMS60	60168810
28	4	SOCKET SET SCREW 1/4-20 UNC X 3/8	STEEL	SSS025C037
29	2	GAGE RING	DLMS60	60268830



**VSI-X HT PACKER**  
 w/ VITON, CARBIDE, STUB ACME  
 MANDREL, INCOLOY 925 FLOW WET  
 6-5/8" X 3-1/2" (9.3#) CS HYDRIL

Manual No:  
**DL-601-6625-1279**

Revision: **A**

Revision Date:  
**10/14/2019**

Authored by: *J.Anderson*

Approved by: *K.Plunkett*

**L) PARTS LIST (cont'd)**

ITEM	QTY	DESCRIPTION	MATERIAL	PART NUMBER
30	1	BEARING BUSHING	DLMS35	60373224
31	1	SPRING RETAINER RING	DLMS35	60073820
32	1	BOTTOM NIPPLE	DLMINC925	60373636-LGJHA
33	1	155 O-RING	90 DURO VITON	90155V
34	2	237 O-RING	90 DURO VITON	90237V
35	1	243 O-RING	90 DURO VITON	90243V
36	8	SHEAR SCREW (4600#) 7/16-20 UNF X 7/16	DLM360BRS	BSSSLT043F043*

\*Refer to WLAK technical illustration for placement.

REDRESS KIT (RDK)	60168050HTV
ASSEMBLED WEIGHT	319 LBS





# VSI-X HT PACKER

w/ VITON, CARBIDE, STUB ACME  
MANDREL, INCOLOY 925 FLOW WET  
6-5/8" X 3-1/2" (9.3#) CS HYDRIL

Manual No:  
**DL-601-6625-1279**

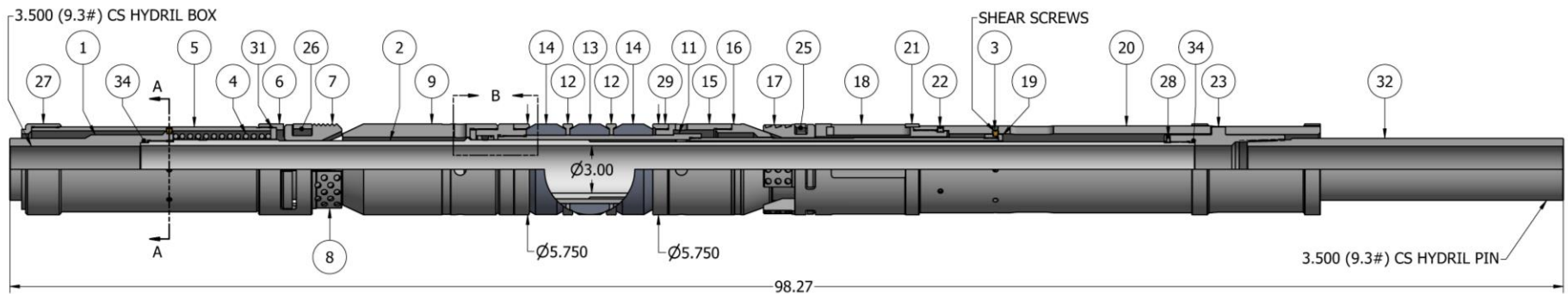
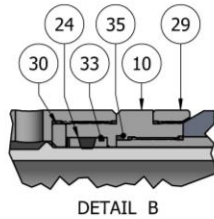
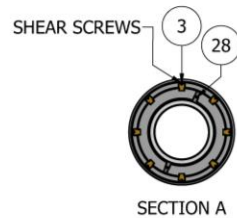
Revision: **A**


Revision Date:  
**10/14/2019**

Authored by: *J.Anderson*

Approved by: *K.Plunkett*

## M) TECHNICAL ILLUSTRATION



	<b>VSI-X HT PACKER</b> w/ VITON, CARBIDE, STUB ACME <b>MANDREL, INCOLOY 925 FLOW WET</b> 6-5/8" X 3-1/2" (9.3#) CS HYDRIL	Manual No: <b>DL-601-6625-1279</b>
		Revision: <b>A</b>
		Revision Date: <b>10/14/2019</b>
<i>Authored by: J.Anderson</i>		<i>Approved by: K.Plunkett</i>

**N) REVISION HISTORY**

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
10/11/2019	A	Created new manual	-	-